2011

R8 Series User Manual

Forwell Wireless Ltd.

2011-4-27

Copyright Declaration

"倚天丰华®"and Forwell倚天丰华 are the registered trademarks of Shenzhen Forwell Wireless Co., Ltd. The copyright of all the product parts, including accessories and the software, belongs to Shenzhen Forwell Wireless Co., Ltd. Without the permission of Shenzhen Forwell Wireless Co., Ltd, any copy and translating is not allowed.

All the pictures and specifications of the product are just for reference, which will have tiny difference with the upgrading of the product. If there is any change of the product, we will not give further notice. If you want to know more about the product, please visit our website: http://www.forwellwireless.com

Forwell Wireless

Sales	**Phone**	**+86-755-26624211**
	Hours	8:30 AM to 6:30 PM GMT+8
	E-mail	sales@forwellwireless.com
	FAX	+86-755-26621490
Post	2-4A,Chaguang Industrial Park, Nanshan District,Shenzhen,Guangdong Province P.R.China	
Web	http://www.forwellwireless.com	

Catalog

Chapter 1 Instruction Manual Introduction 4
1.1 Purpose 4
1.2 Application Fields 4
1.3 Version Information 4
1.4 Technical Support 5
Chapter 2 Product Introduction 6
2.1 Brief Introduction to the Products 6
2.2 function features 7
2.3 application Fields 8
2.4 Product model 9
Chapter 3 Hardware Installation 9
3.1 Overall Dimension 10
3.2 Accessories Description 11
3.3 Installment 12
3.3.1 SIM/UIM card installed 12
3.3.2 Grounding 13
3.3.3 Check Network Status 13
Chapter 4 Software configuration 14
4.1 Overview 14
4.2 How to log into the Router 14
4.2.1 network Configuration of the Computer. 14
4.2.2 log into Router 15
4.3 How to config web 17
4.3.1 Main Menu as below Picture 17
4.3.2 Operation Mode 17
4.3.3 WAN Settings 18
4.3.4 LAN Settings 21
4.3.5 DHCP Client 21
4.3.6 Configure Static Routing 22
4.3.7 Qos(Quality of Service) 22
4.3.8 VPN 24
4.3.9 DTU Settings 29
4.3.9 SMS/Voice Control（it is only used for R86B/R89B） 30
4.3.10 GPS(OPTIONAL) 31
4.3.11 Wirless settings 31
4.3.12 Firewall 33
4.3.13 Administration 36

Forwell Wireless

Chapter 1 Instruction Manual Introduction

This chapter is about the related operation information of the R8 Routers. It is the best instruction manual for installing and using R8 series.

1. Purpose
2. Application Fields
3. Version Information
4. Technical Support

1.1 Purpose

This Instruction Manual is mainly for the installation and test of the R8 series of Forwell Wireless.

1.2 Application Fields

This Instruction Manual is suitable for the users who has certain knowledge of computer network and electronic technology, network device administrators and other management personnel who need to use R8 series.

1.3 Version Information

According to the requirement of the market and the users, we will make some functional adjustment and technical improvement to the R8 series. Below table includes all the versions of the R8 series of Forwell Wireless and revision reasons in different periods.

Table-1.1：Version Information

Forwell Wireless

Version No.	Revision Department	Related Department	Start-stop Date	Revised Content
1.0.0	R&D Center	Sales, Technical Engineer	2010.12	First publish
2.0.0	R&D Center	Sales, Technical Engineer	2011.1	Add the product function and make adjustments to the hardware
2.1.1	R&D Center	Sales, Technical Engineer	2011.3	

1.4 Technical Support

In order to solve the problems in the Router use more quickly and get the right solution in hardware, operation system and installation and test. Please contact us by:

- ☎ Tel：

  Service Hot-line: 0755-26621490

- ✉ E-mail:

  Technical Support: xiegang@forwellwireless.com
  qiaochao@forwellwireless.com

For more information, please check this website www.forwellwireless.com.

Forwell Wireless

Chapter 2 Product Introduction

This chapter mainly describes the function of R8 series and field of application.

1. *Brief Introduction to the Products*
2. *function features*
3. *application*
4. *Product model*

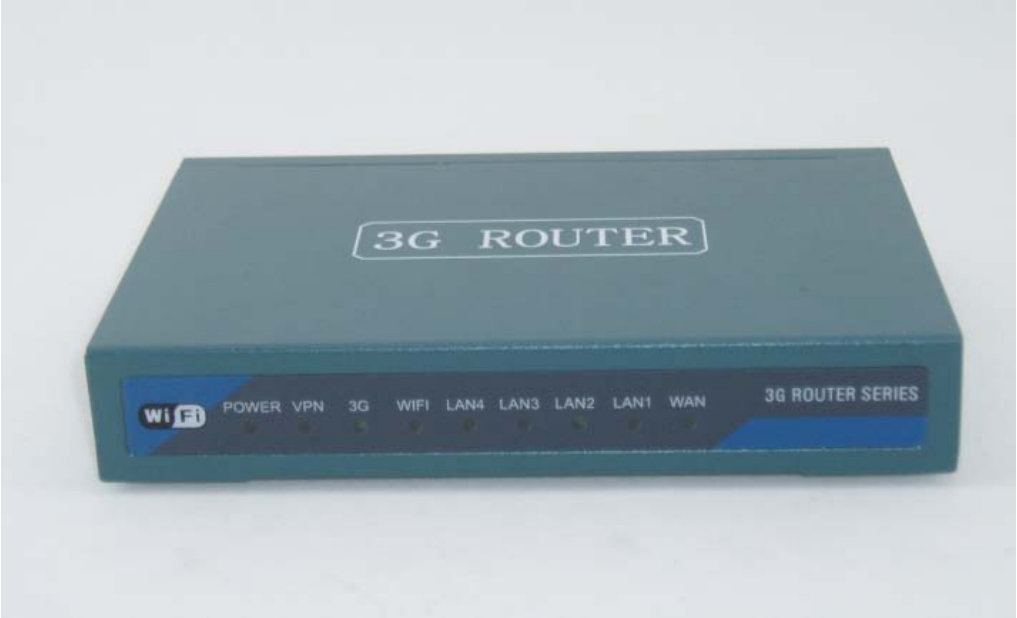
2.1 Brief Introduction to the Products

With the development of the mobile communication technology, the mobile data communication network using the EVDO/TD-SCDMA/HSDPA/HSUPA has covered all regions in China. And the network is very stable. All these make a larger market for the R8 series application. Because different industries have different applications and different information needs, so the industry application solutions provided by the mobile communication operators must satisfy both the common needs and the special individual needs of the industry users perfectly. Therefore, in recent two years, based on the needs of industry users, Telecommunication, Mobile and Unicom do innovative practice energetically in mobile application and provide solutions to meet the unique needs of the users. Being different with the popular data requirements, indusry application is very

Forwell Wireless

professional. Different industry users need different terminals. So hardware and software development and system integration must be accord with different industry needs. So by analysing the different industry application features in recent years and according to the network features and the actual condition of the network operators, Forwell Wireless Ltd launched the individually designed R8 series.

R8 series developed by Forwell Wireless Ltd provide users the high-speed, always-online and transparent-data-transmission communication network. In order to meet the needs of Electronic Power System Automation, Industry Monitoring, Transportation Management, Weather, Environment Protection, Pipe Network Monitoring, Finance and Bond industries, by using 2G/3G network R8 series achieve the transparent data transmission function.



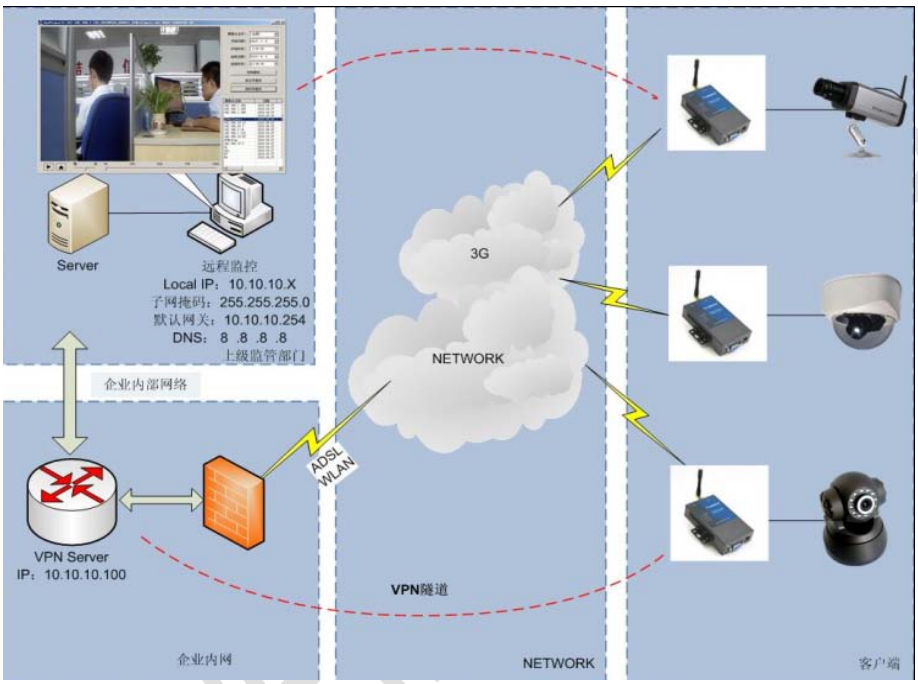
2.2 function features

- Supports EV-DO RevA/Rev0, 1xRTT, HSUPA, HSDPA, UMTS, EDGE & GPRS network
- 1 port 10/100 Ethernet LAN switch with LAN / DMZ configurable zones
- 3G module Built-in
- Support WiFi 802.11b/g/n
- RS-232 port offer a transparent channel for M2M application
- IPSec-based VPN client w/DES, 3DES, AES
- Stateful Packet Inspection Firewall

- Supports dynamic or static IP addresses assigned by cellular carriers
- Support APN/VPDN network

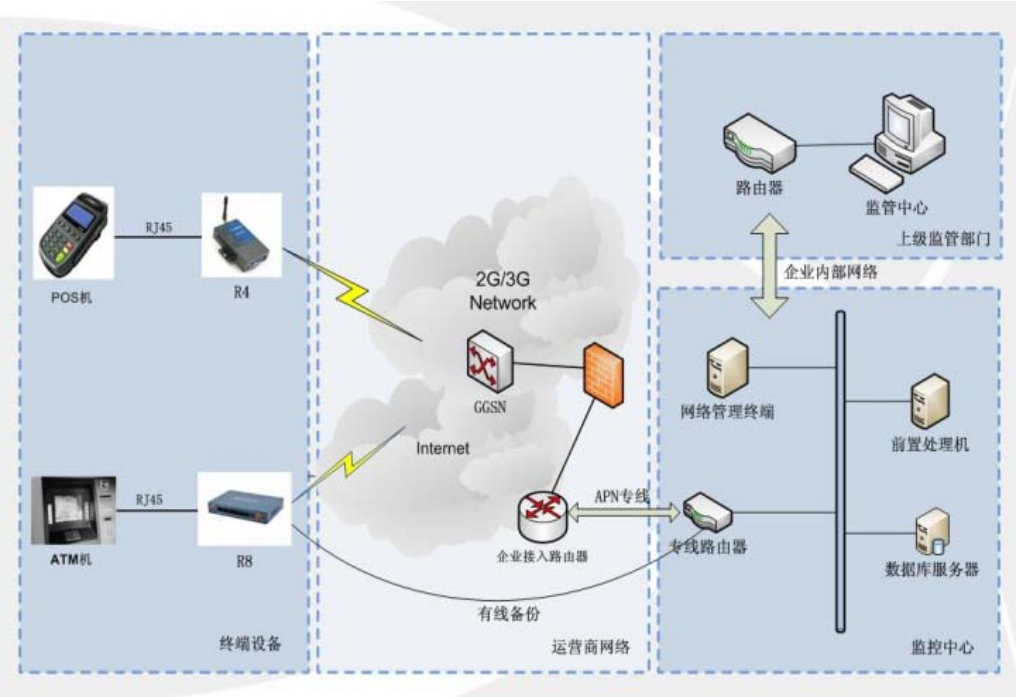
2.3 application Fields

- Video Surveillance



- Financial Service(ATM&POS)

Forwell



2.4 Product model

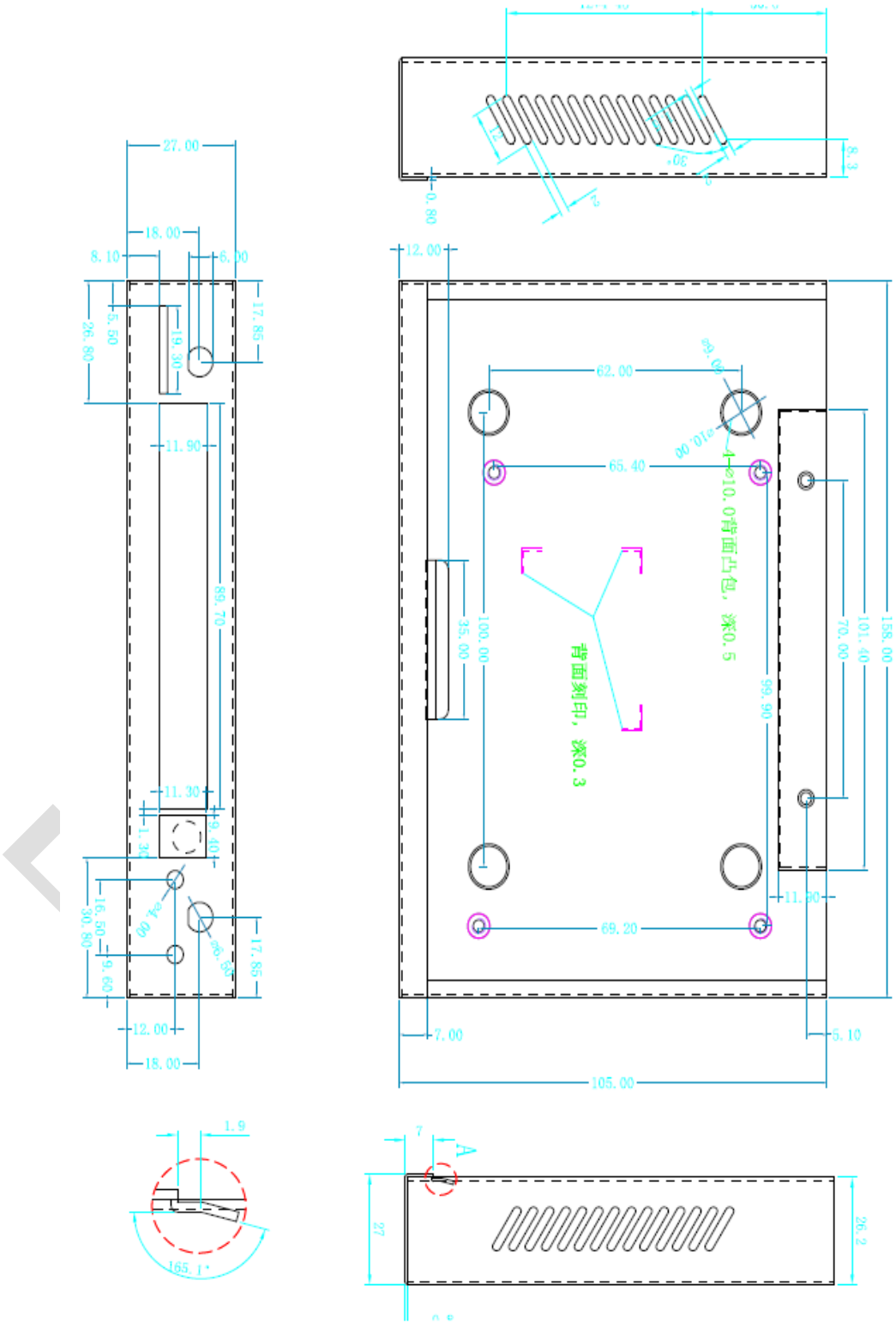
R89 HSUPA Router
R88 TDSCDMA Router
R87 HSDPA Router
R86 EVDO revA Router
R861Y232 EVDO revA Router

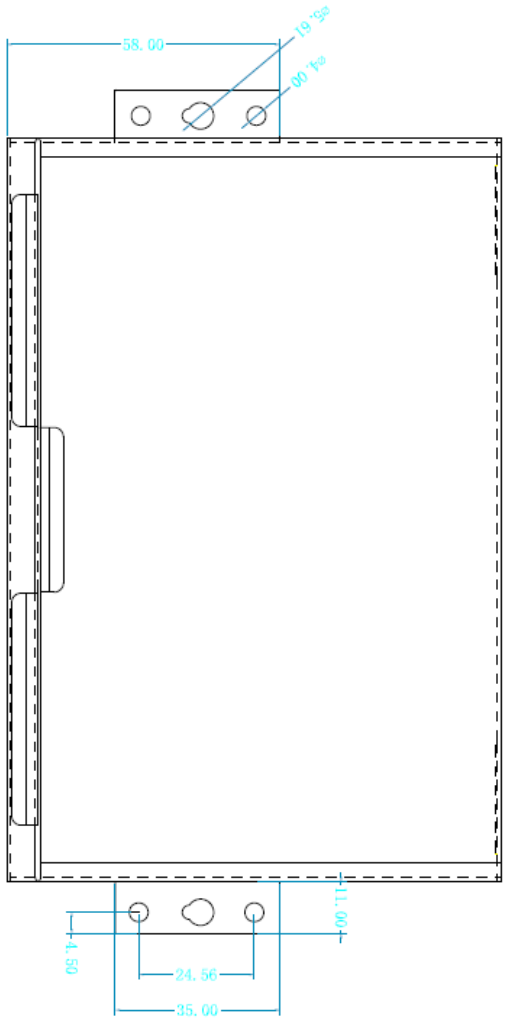
Chapter 3 Hardware Installation

This chapter mainly describes the appearance, model and function of R8 series and how to install and set the configurations.

1. *Overall Dimension*
2. *Accessories Description*
3. *Installment*

3.1 Overall Dimension





3.2 Accessories Description

Name	Entires	Quantity	Describe	Pcture
Device	piece	1	Standard	
Power	piece	1	12V1A	
antenna	piece	2	Standard	
Network cable	bar	1	Standard	
Usermanual	piece	1	Standard	CD-ROM

3.3 Installment

R8 series should be installed and configured properly before putting in service.The installation and configuration should be done or supervise by qualified engineer.

Attention:

Don’t install R8 series or connect/disconnect its cable when it is power on.

3.3.1 SIM/UIM card installed

Load or remove SIM/UIM card, need to have equipment back cover turned, up gently, gap outwards, broke it gets stuck under load, toward the chip can buckle up. Remove UIM card, SIM/broke it gets stuck, thrust the card can slip out.

Attention: *SIM/UIM card does not reach the designated position, the equipment can not find a card, can't work normally, therefore inserted a try to check again for a SIM card is stuck fast.*

3.3.2 Grounding

To ensure a safe ,stable and reliable R8 series operation,Router cabinet should be grounded properly.

3.3.3 Check Network Status

Please connect the antenna after you successfully connect to the cable. And then insert the valid SIM/UIM card and provide the power to the R8 series via the cable. After provide the power to R8, if the POWER light start to blink in a few seconds, that means the system start-up is normal; if the 3G light works, that means the network has been found; if the VPN light works, that means VPN tunnel has been set up. Please refer to the below table for the situation of the indication lights.

LED	Indication Light	Description
POWER	On for 3 seconds	On for 3 seconds after power supply
	blink	System set-up normally
	Off or still on after 3 seconds	System set-up failure
Lan*4	blink	Data transmission in Ethernet
	Off	Ethernet connection abnormal
VPN	On	VPN tunnel set-up
	Off	VPN tunnel set-up failure
3G	On	Access to the Internet
WIFI	On	Enable
	Off	Disable

Chapter 4 Software configuration

1. *Overview*
2. *How to log into the Router*
3. *How to config web*

4.1 Overview

R8 series routers with built-in WEB interface configuration, management and debugging tools, user should configuration the parameters first;and it could be altered the parameters flexibility and software upgrades and simple testing.
user can set up and manage the parameters of the router on its interface ,detail step as belows :.

4.2 How to log into the Router

4.2.1 network Configuration of the Computer.

The router default parameters as follow
IP: 10.10.10.254, sub mask: 255.255.255.0.

There are two ways to set the PC's IP address.

1. Manual setting

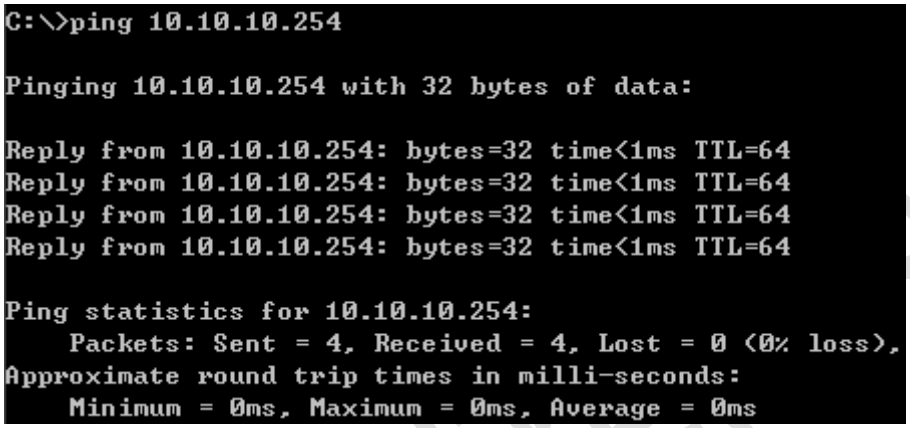
Forwell Wireless

Set the PC IP as 10.10.10.xxx (xxx = 1~253), subnet mask: 255.255.255.0, default gateway: 10.10.10.254, primary DNS: 10.10.10.254.

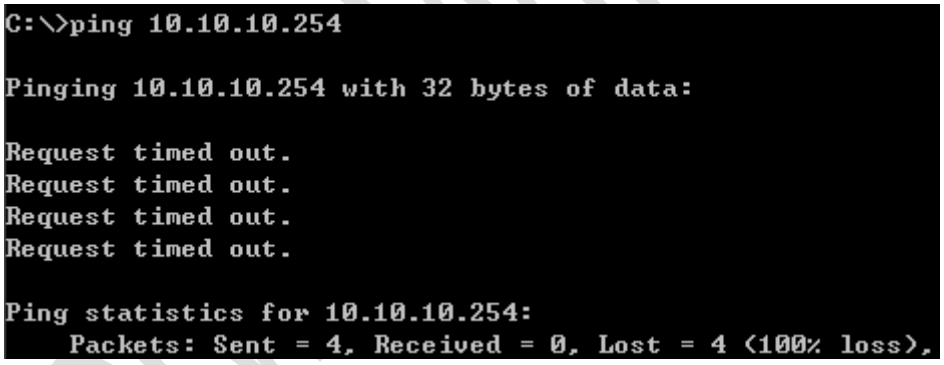
2. DHCP

Choose “Obtain an IP address automatically” and “Obtain DNS server address automatically”.

After IP setting, check it by ping. Click Windows start menu, run, execute “cmd” command. Input “ping 10.10.10.254” in the DOS window.


C:\>ping 10.10.10.254
Pinging 10.10.10.254 with 32 bytes of data:
Reply from 10.10.10.254: bytes=32 time<1ms TTL=64
Reply from 10.10.10.254: bytes=32 time<1ms TTL=64
Reply from 10.10.10.254: bytes=32 time<1ms TTL=64
Reply from 10.10.10.254: bytes=32 time<1ms TTL=64
Ping statistics for 10.10.10.254:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms

This information means the connection is work.


C:\>ping 10.10.10.254
Pinging 10.10.10.254 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 10.10.10.254:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

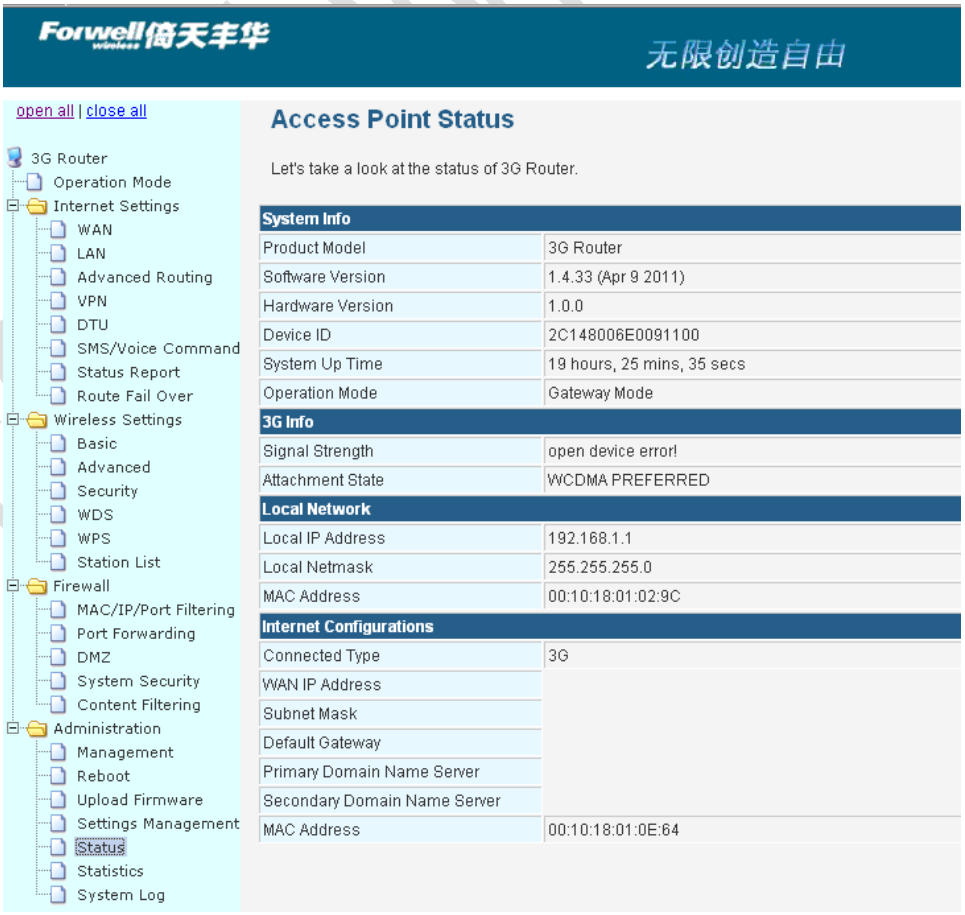
This information means the connection is failure. If so, please check the network cable connection and IP address setting.

4.2.2 log into Router

- Open the Web browser, and type http://10.10.10.254 into the address field and press Enter botton in your computer keyboard.
- Type User Name “admin” and Password “admin” in the pop-up Login Window, and then press the “Apply” button.

Connect to 10.10.10.254
The server 10.10.10.254 at GoAhead requires a username and password.
Warning: This server is requesting that your username and password be sent in an insecure manner (basic authentication without a secure connection).
User name:
admin
Password:
Remember my password
OK
Cancel

- If you type into the correct User Name and Password, you will get the access into the Router's Web Management Page.



4.3 How to config web

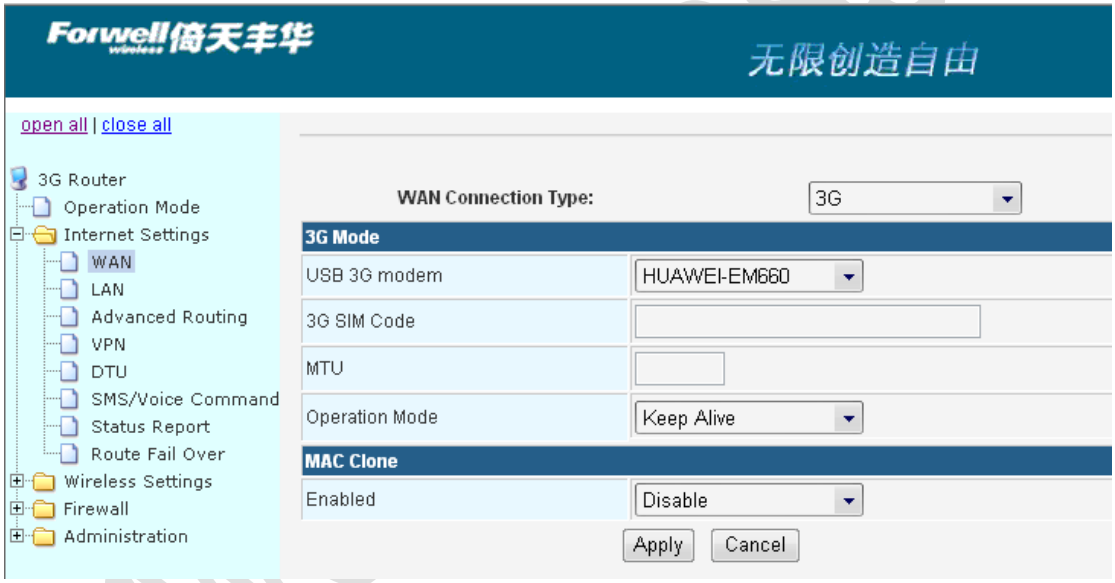
4.3.1 Main Menu as below Picture

4.3.2 Operation Mode

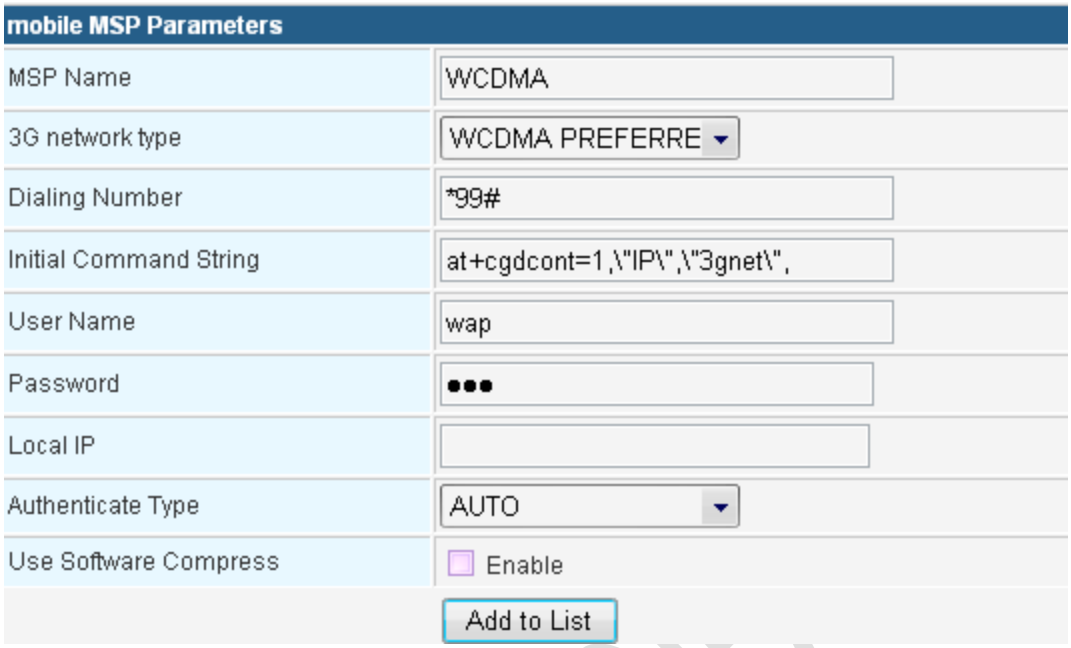
Forwell倚天丰华
无限创造自由
open all | close all
3G Router
Operation Mode
Internet Settings
Wireless Settings
Firewall
Administration
Operation Mode Configuration
You may configure the operation mode suitable for you environment.
Bridge:
All ethernet and wireless interfaces are bridged into a single bridge interface.
Gateway:
The first ethernet port is treated as WAN port. The other ethernet ports and the wireless interface are bridged together and are treated as LAN ports.
AP Client:
The wireless apcli interface is treated as WAN port, and the wireless ap interface and the ethernet ports are LAN ports.
NAT Enabled
Enable
Apply
Cancel

- **Bridge:** All ethernet and wireless interfaces are bridged into a single bridge interface.
- **Gateway:** The first Ethernet port is treated as WAN port. The other Ethernet ports and the wireless interface are bridged together and are treated as LAN ports.
- **AP Client:** The wireless apcli interface is treated as WAN port and the wireless ap interface and the Ethernet ports are LAN ports.
- **NAT:** Network Address Translation

4.3.3 WAN Settings



- WAN Connection Type support: Static IP, DHCP, PPPoE, L2TP, PPTP, 3G.
- USB Modem: System supports the follow module: HUAWEI EM560（for R88 TD-SCDMA）, HUAWEI EM660/THINKWILL MI600(for R86 EVDO), and HUAWEI EM770/LONGSUNG-U6300/U5300(for R89 HSPA). Please choose right USB modem.
- 3G SIM PIN: enter PIN code if necessary.
- Operation Mode: always online, connect on demand, connect on time. The default mode is always on line.
- MAC Clone: enable and disable the MAC clone function.



- **Mobile MSP parameters:** edit the MSP parameters.
- **MSP Name**: any name is ok
- **3G network type**: you can choose right network here.
- **Dialing Number**: Input the Dialing Number you get from ISP. For example, China Telecom (#777)
- **Initial Command String:** you need to input the username and password or APN offered by ISP with our Initial command

  R86 EVDO:pleaseinput: at\^pppcfg=\"username\",\"password\" Take China Telecom (both username and password are "CARD")as a sample: we input this command at\^pppcfg=\"CARD\",\"CARD\"
  (HUAWEI_EM660/Thinkwill MI600)

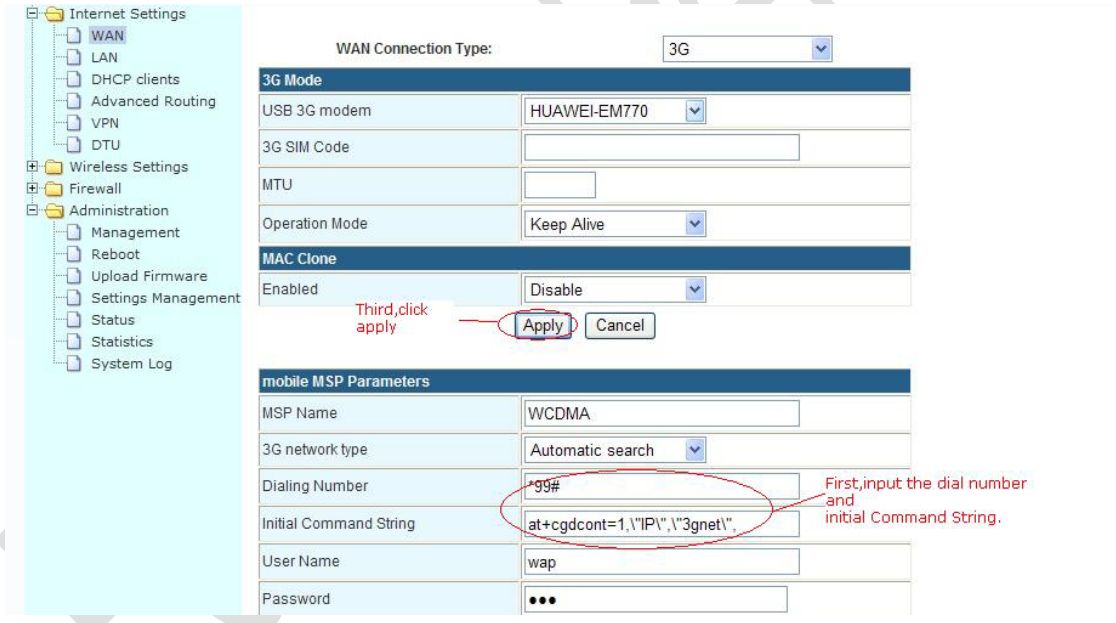
  R87/R89 HSPA: at+cgdcont=1,\"IP\",\"APN\", Take China Mobile(Their APN is 3gnet) as a sample: we input this command at+cgdcont=1,\"IP\",\"3gnet\",
  (HUAWEI_EM770/U5300/U6300/GaoRan280)

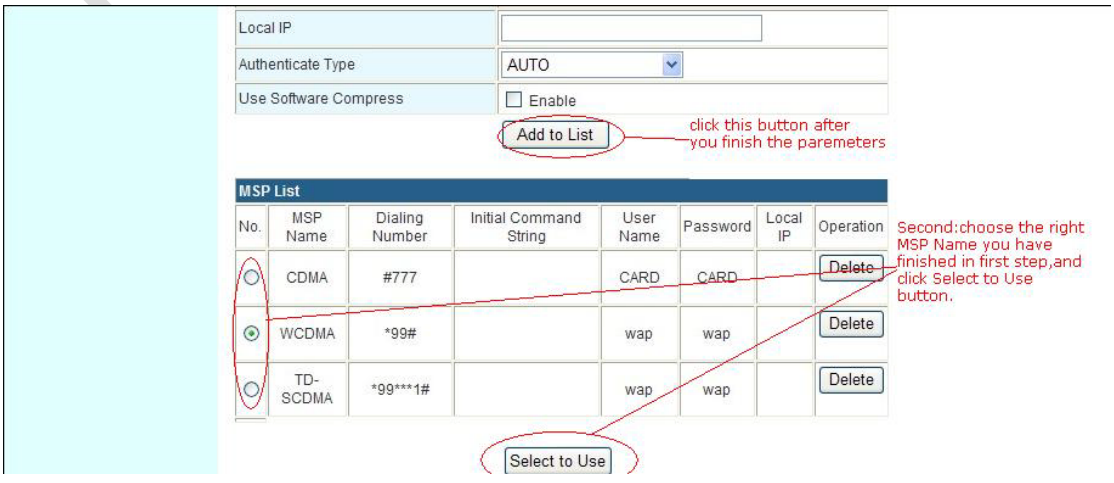
  Username and Password: input them.
- **Authenticate Type:** PAP/CHAP, the default setting is auto.

Forwell Wireless

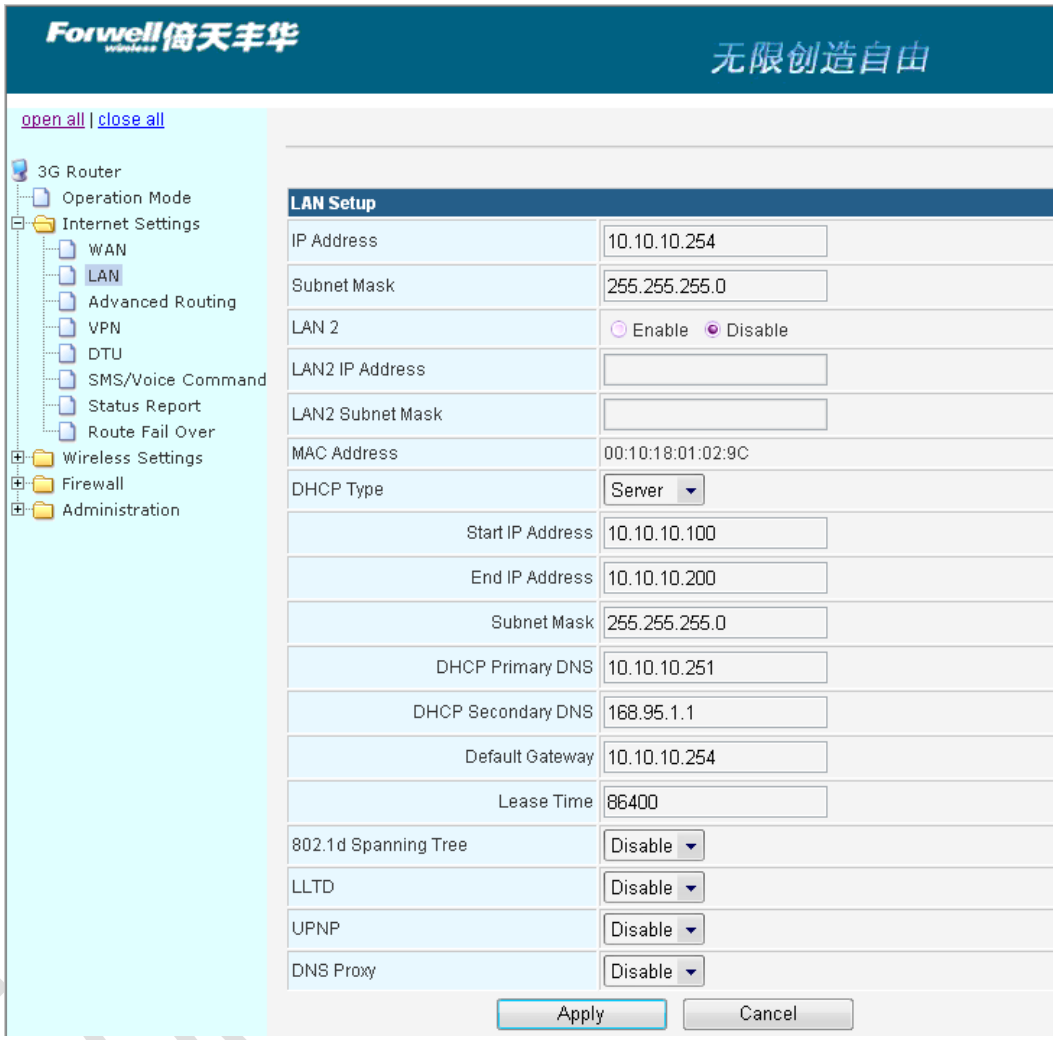
MSP list: This list is produced automatically once you finish the above mobile MSP parameters.just choose the right MSP parameters and corresponding module(3G USB modem), and click Apply, then it will dial.

For example, we use R89 HSPA router to dial:



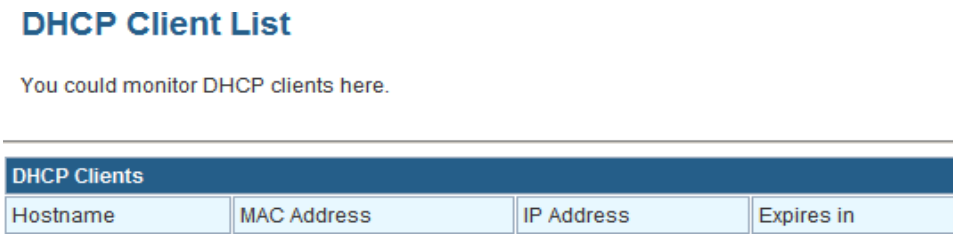


4.3.4 LAN Settings



Setting the LAN parameters, include IP address, sub mask, VLAN, DHCP, etc.

4.3.5 DHCP Client



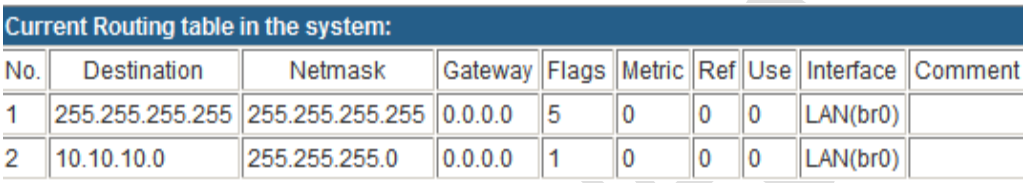
List the Clients which gain IP address from DHCP .

4.3.6 Configure Static Routing

This section mainly introduce what is Routing Table and how to configure static router.

- Routing Table

  This page shows the key routing table of this router.

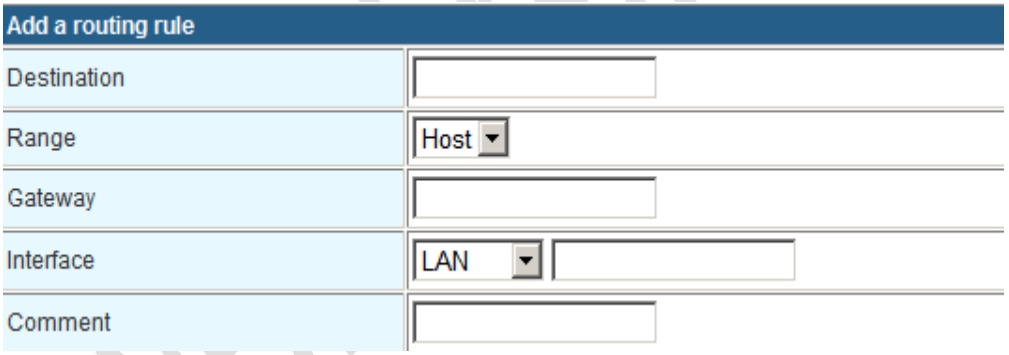


Current Routing table in the system:

No.	Destination	Netmask	Gateway	Flags	Metric	Ref	Use	Interface	Comment
1	255.255.255.255	255.255.255.255	0.0.0.0	5	0	0	0	LAN(br0)	
2	10.10.10.0	255.255.255.0	0.0.0.0	1	0	0	0	LAN(br0)	

- New Static Router

  This page is about how to set static routing function of the router.



§ **Destination**: please enter Target Host or IP network segment
§ **Range**: Host or Network can be chosen
§ **Gateway**:IP address of the next router.
§ **Interface**: You can choose the corresponding interface type.
§ **Comment**: some notes
Notice:

- Gateway and LAN IP of this router must belong to the same network segment.
- If the destination IP address is the one of a host, and then the Subnet Mask must be 255.255.255.255.
- If the destination IP address is IP network segment, it must match with the Subnet Mask. For example, if the destination IP is 10.0.0.0, and the Subnet Mask is 255.0.0.0.

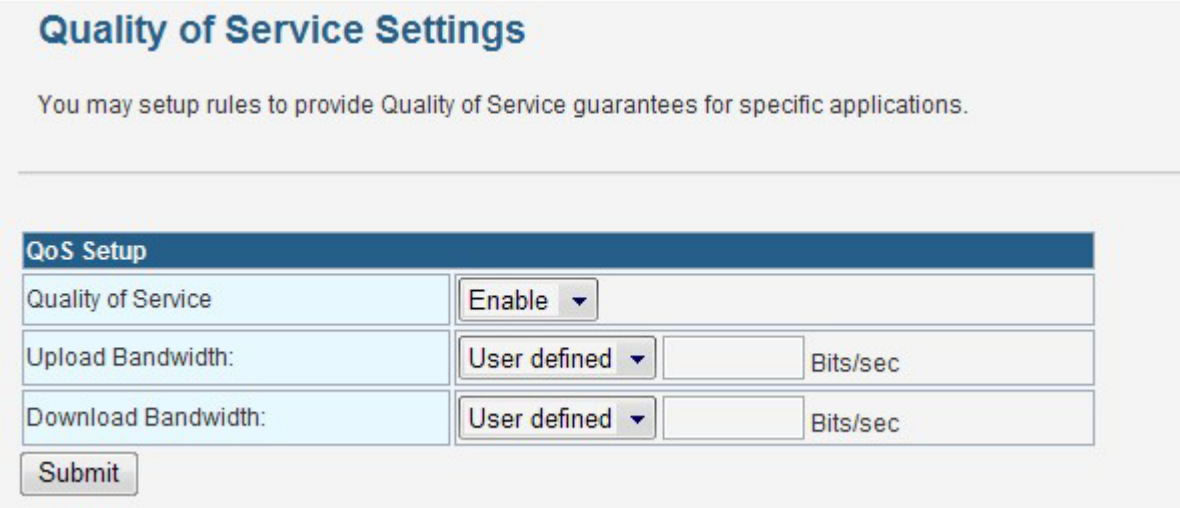
4.3.7 Qos(Quality of Service)

QoS (Quality of Service) Service Quality, is one of the network security mechanism, is

used to solve the network to delay and block of a kind of technology. In normal conditions, if the network only used for particular no time limit of application system, does not need QoS, such as the Web application, or E-mail setting, etc. But for critical applications and multimedia applications is very necessary. When the network overload or congestion, QoS can ensure that important business from delay or discarded, at the same time, to guarantee that the network of efficient operation.

The Quality of Service Setting:

The interface on a router, find QoS quality service set up options, the configurations. As shown in figure.

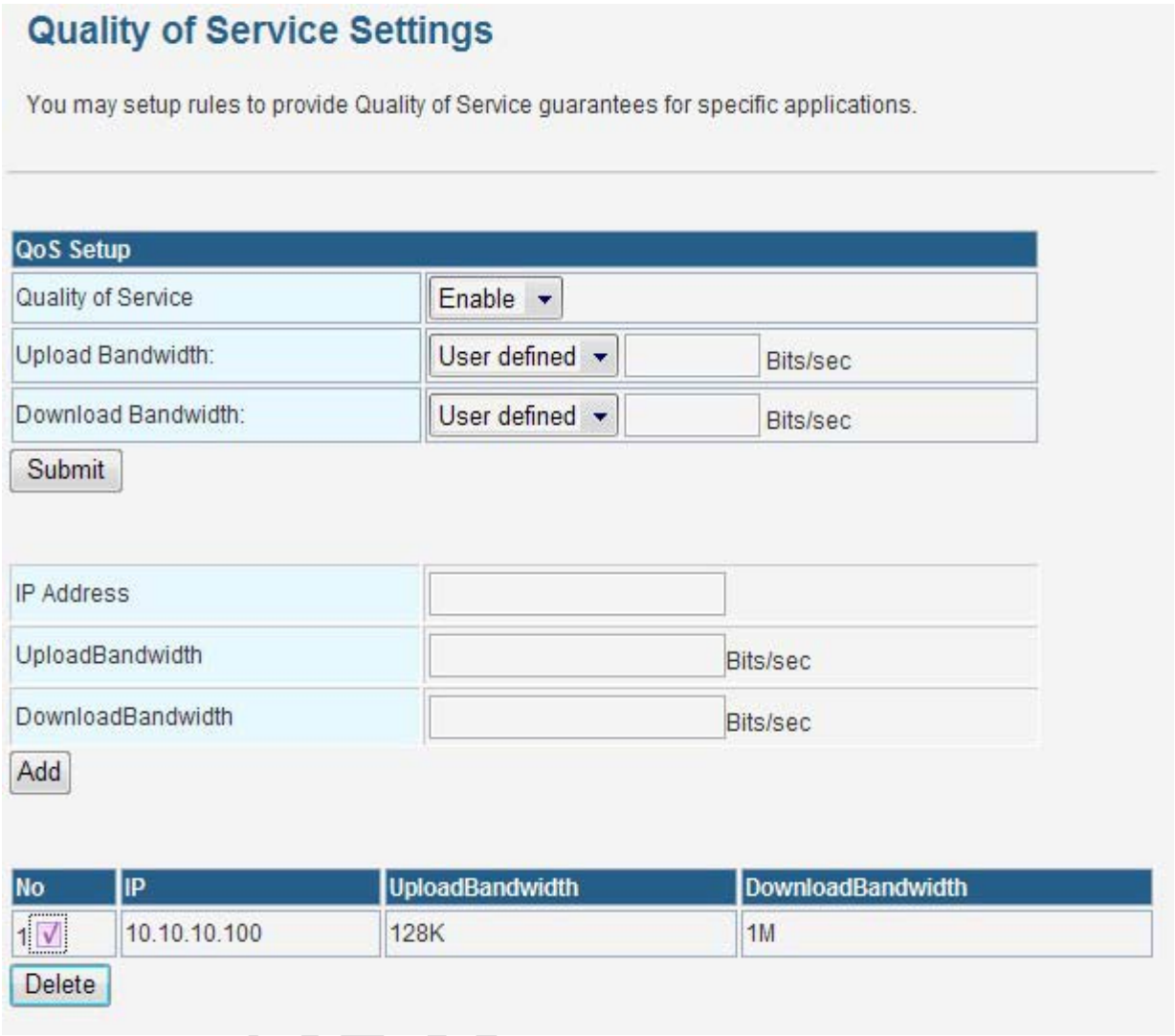


First, choose open QoS function, the user can need according to custom upload bandwidth and download bandwidth, can also through the drop-down list to choose the appropriate bandwidth, and click submit.

Then, the input to the speed limit of LAN IP address, fill out the upload bandwidth and descending bandwidth, it should be noted, fill in to pay attention to the Numbers behind the unit made clear, 10 K or 10 M, click the Add.

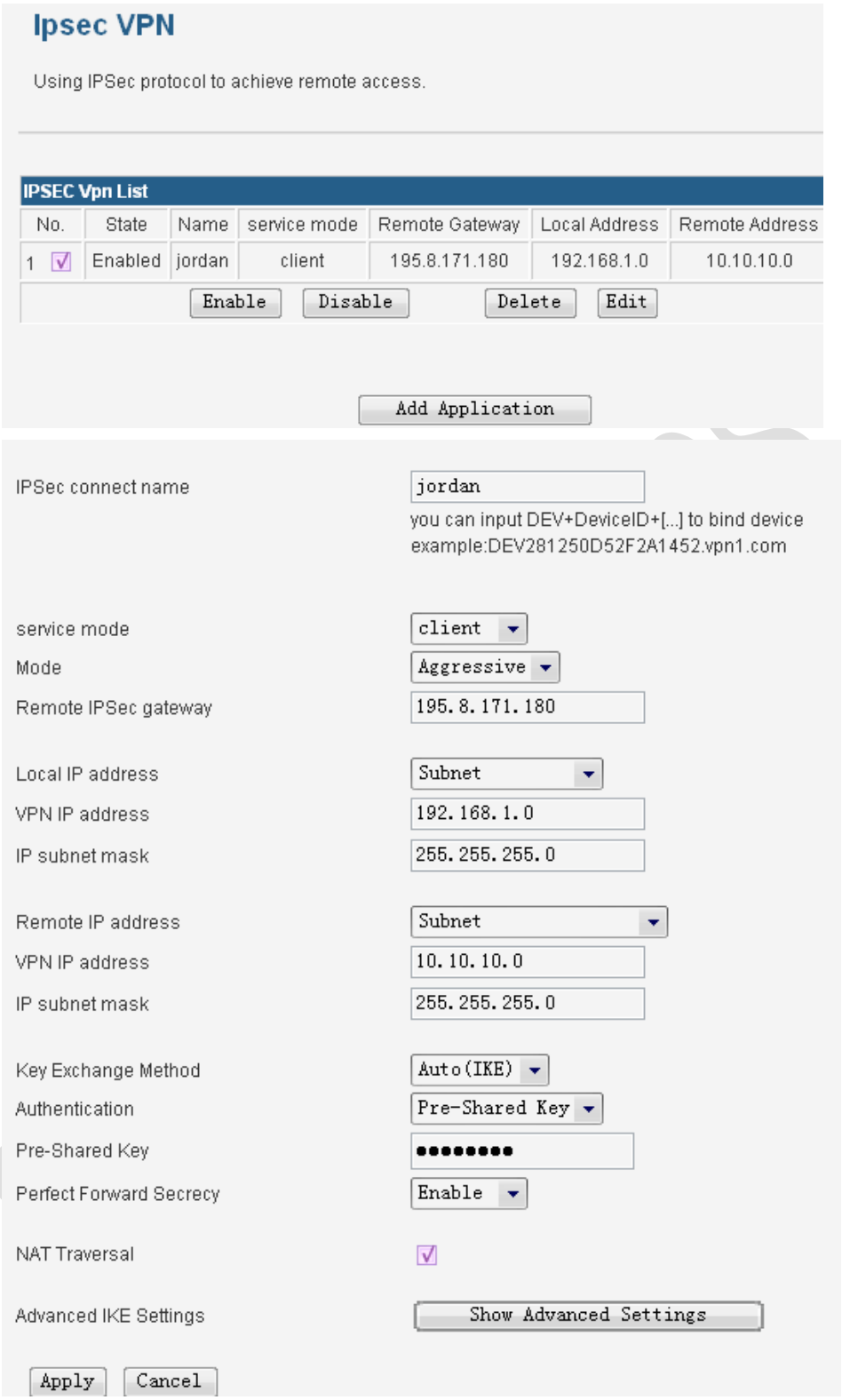
Finally, as you can see, just add IP information is in list directory, in Numbers and played the hook on set up a success.

pictorial view：



4.3.8 VPN

4.3.8.1 IPSEC

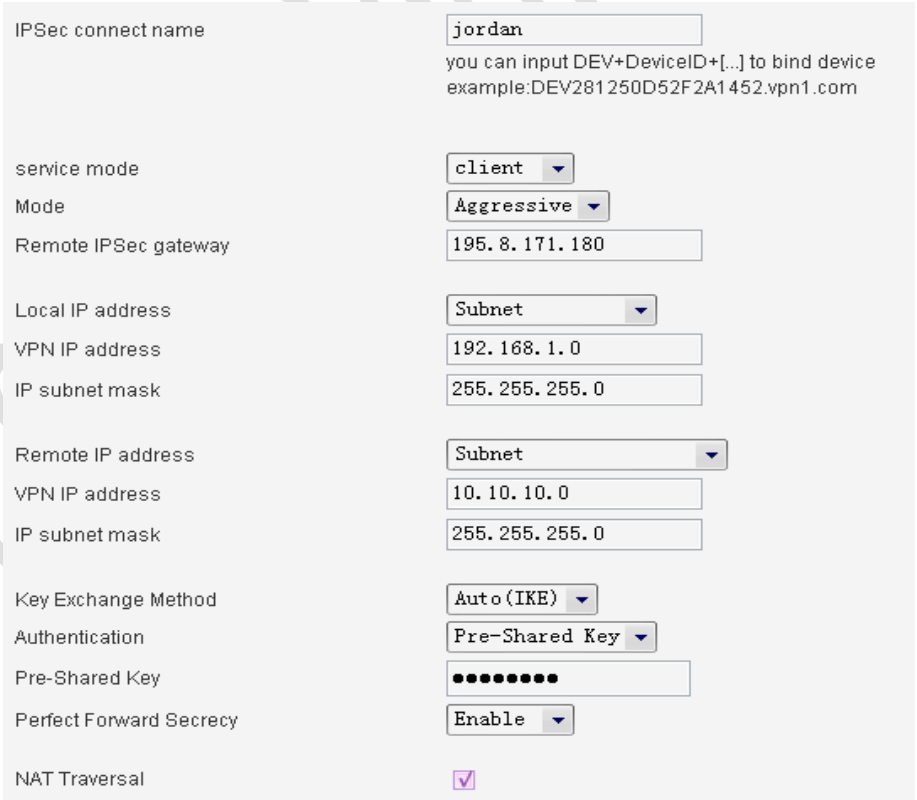


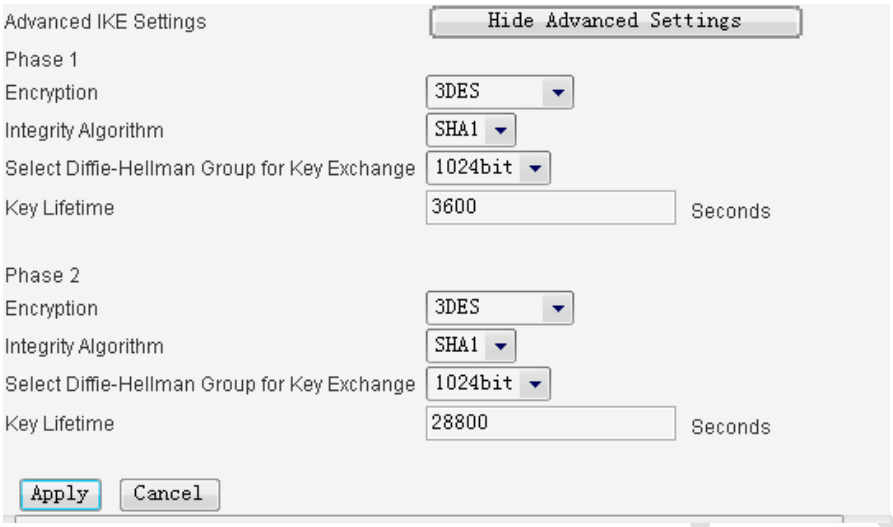
- **IPsec connect name**: make sure the name in client and server are same, we suggest to use domain name(111.vpn1.com). if you want to build a point-to-point channel, the IPsec name have to be written as DEV+equipment ID+name(DEV281250D52F2A1452.vpn1.com), and make sure both the client and server are inputing Client equipment ID. You can find R8's ID in the Status interface.

- **Service Mode**: Server/Client
- **Mode**: Main/Aggressive. The Aggressive mode is commonly used.
- **Remote Gateway**: This choice just appears in the Client mode and it is used to fill the IP address in the Server.
- **Local IP address**: Fill LAN IP of this device. You can fill an IP or a network segment.
- **Remote IP address**:Fill the IP of the other router.
- **Authentication**: Commonly, Pre-Shared Key is chosen. And the Client and Server must choose the same key.
- **Advanced AKE settings:** There are some encryption methods in this field. You must use the settings in this field when VPN tunnel needs to be built between R8 and other brand VPN server.
- **Example: Connected cisco 7200 and R8**

  How to config R8 as VPN clinet

  IPsec Name:make sure the name in client and server are same, we suggest to use domain name(111.vpn1.com). if you want to build a point-to-point channel, the IPsec name have to be written as DEV+equipment ID+name(DEV281250D52F2A1452.vpn1.com), and make sure both the client and server are inputing Client equipment ID. You can find R8's ID in the Status interface.



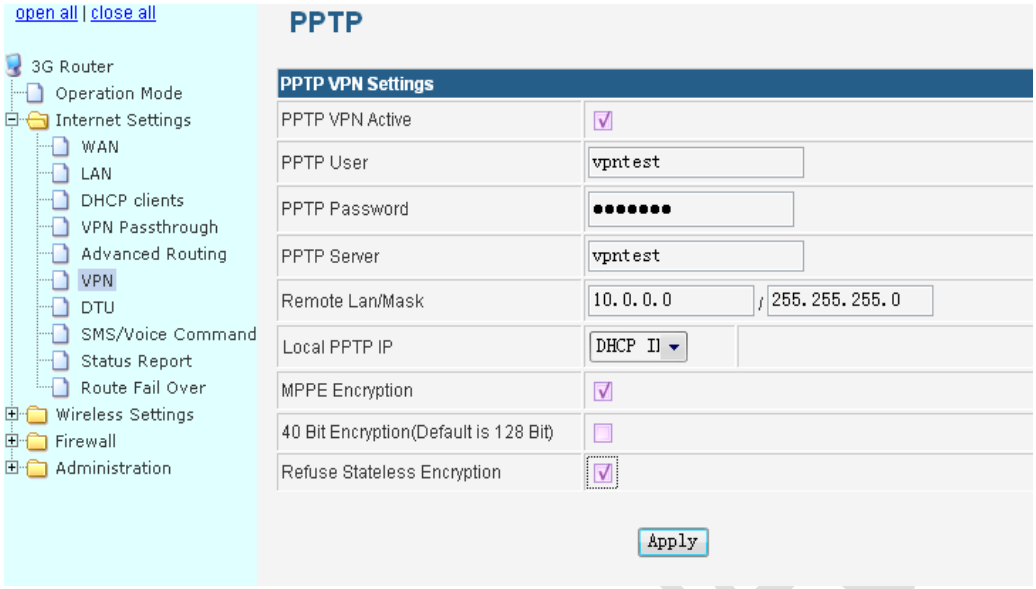


How to config cisco 7200 as VPN Server

```
crypto keyring jordan
 pre-shared-key hostname jordan key test

 crypto isakmp profile jordan
  description china SZ shenzhen
  keyring jordan
  match identity host jordan
  keepalive 60 retry 10

 crypto ipsec transform-set vpnset esp-des esp-sha-hmac

 crypto ipsec profile jordan
set transform-set vpnset
set isakmp-profile jordan

 crypto dynamic-map jordan 1
  set security-association lifetime kilobytes 536870912
  set security-association lifetime seconds 43200
  set transform-set vpnset
  set isakmp-profile jordan
  reverse-route
   crypto map COREVPN 26 ipsec-isakmp dynamic jordan
```

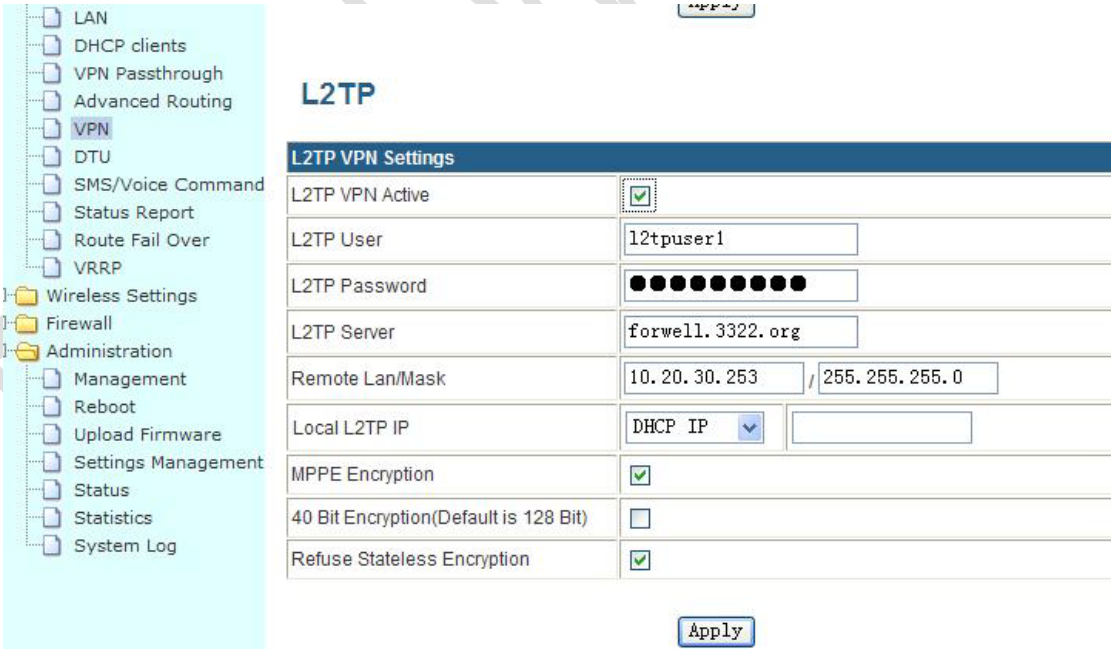
4.3.8.2 PPTP

Forwell Wireless



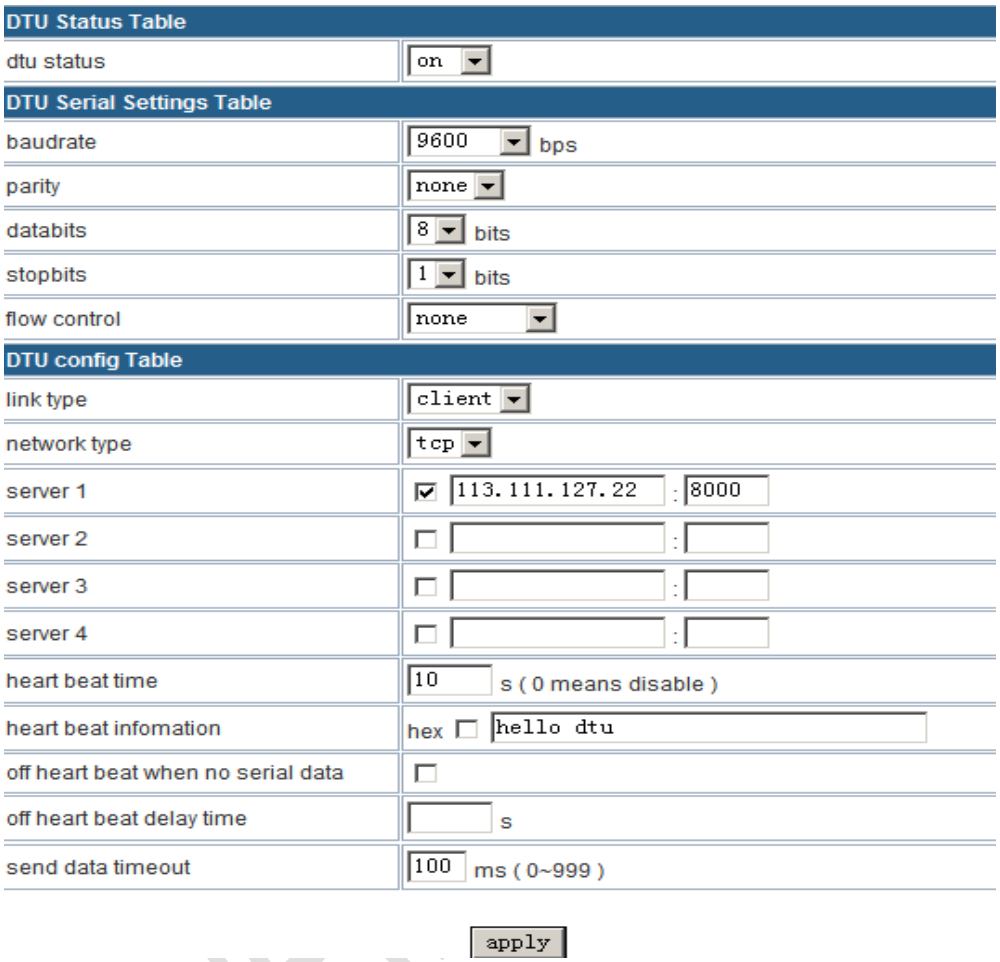
this function in the device just works as Client.

4.3.8.3 L2TP



this function in the device just works as Client.

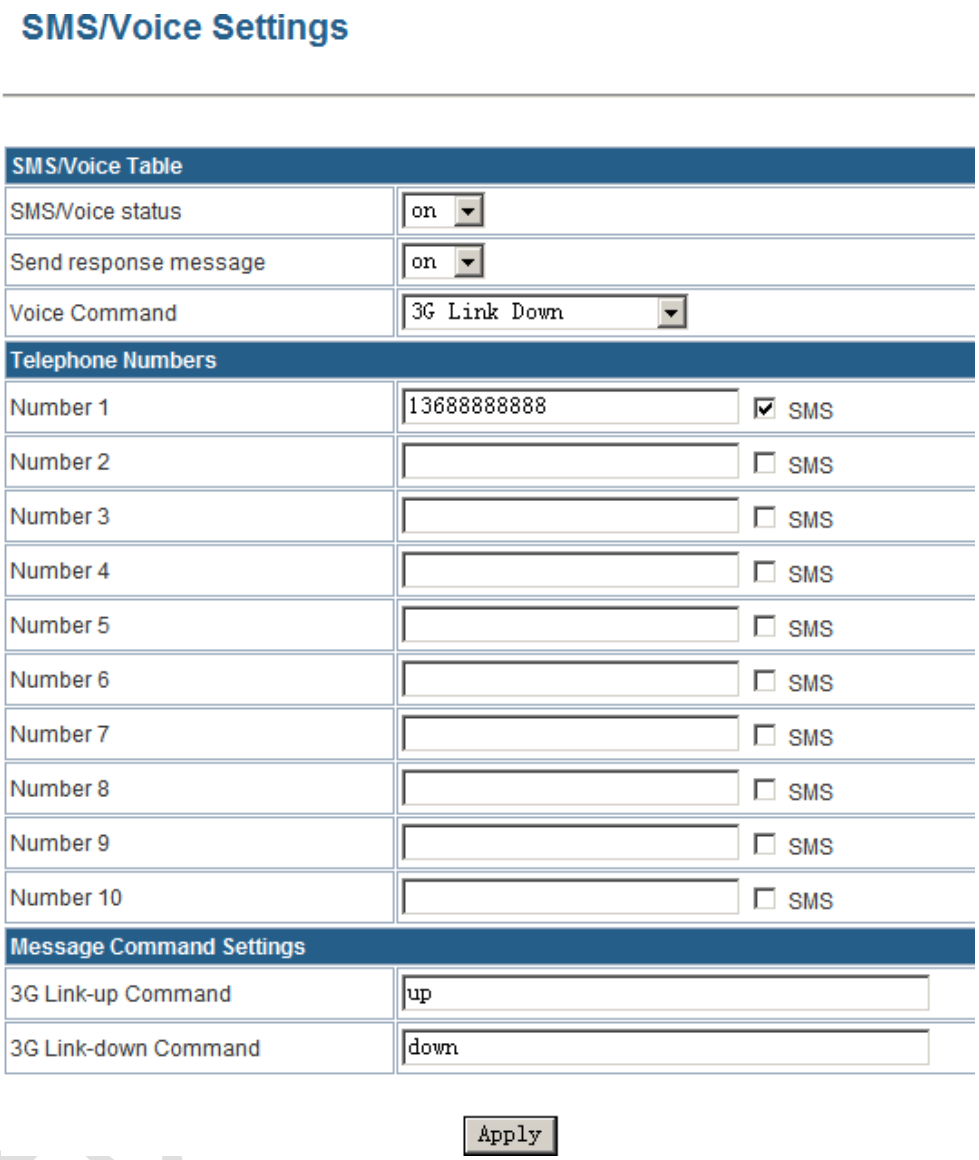
4.3.9 DTU Settings



This section is mainly about DTU settings.

- **DTU status:** open and close DTU
- **Baudrate:** support 4800/9600/19200/38400/57600/115200bps
- **Link Type:** Server link or Client link can be chosen in the DTU config table. If use it as Server, we suggest you to use fixed IP of the SIM card.
- **Multiple-path Backup**: the router can support 4 Server IP at most to meet the need for multiple-path data backup.
- **Heart Beat function**: You can define heart beat time and heat beat information. So that Server can use the heart beat information to identify DTU.
- **Data content:** the largest package contents are 3KB. The interval between packets can be adjusted through change “send data timeout”.

4.3.9 SMS/Voice Control（it is only used for R86B/R89B）



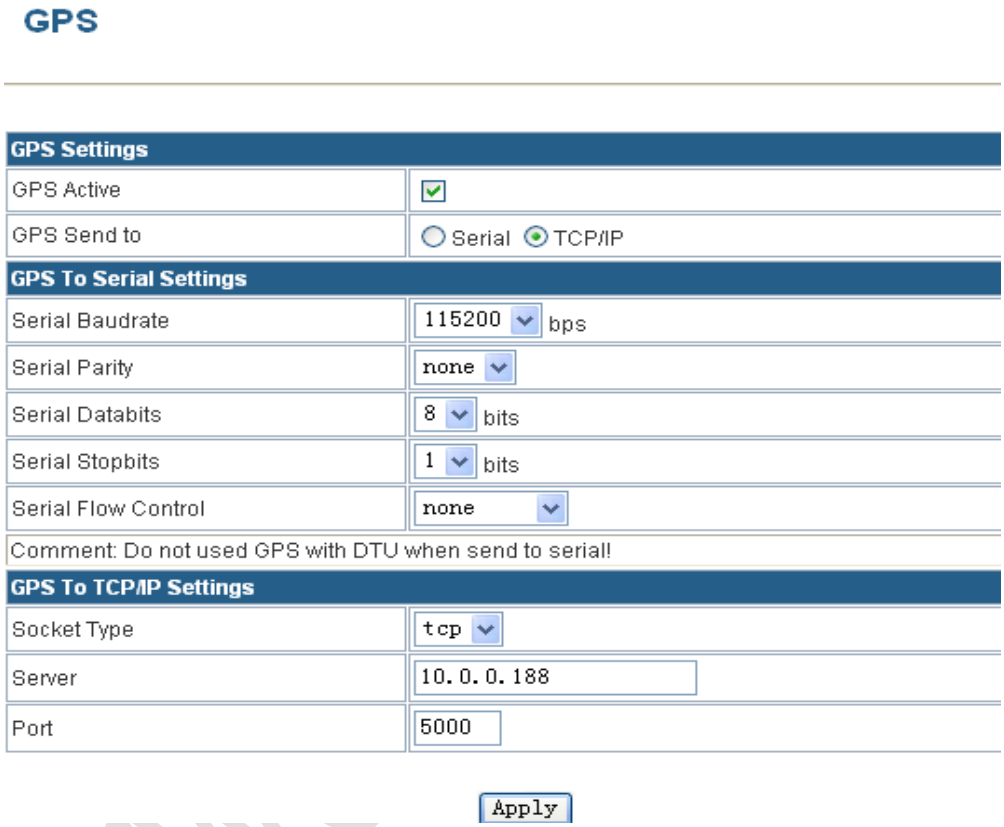
This section is to introduce how to wake up the router from SMS or Voice.

- **SMS/Voice status:** open(on) or close(off) this function.
- **Send respond SMS:** When the router receive a message, it will reply one piece if you choose"on"..
- **Voice Command:** 4 choices(close, 3G link up, 3G link down, 3G link up or down); perform the corresponding action according to what you have chosen. (Note:at present, Voice function do not support phone number filtering.)
- **Telephone Number Settings:** 10 numbers can be set at most, which you can send SMS from these phone numbers.
- **Command Settings:** Sending order by mobile phone can open "3G link up" and "3G link down".

Note: SIM Card inserted in the router must support SMS or Voice.

4.3.10 GPS(OPTIONAL)

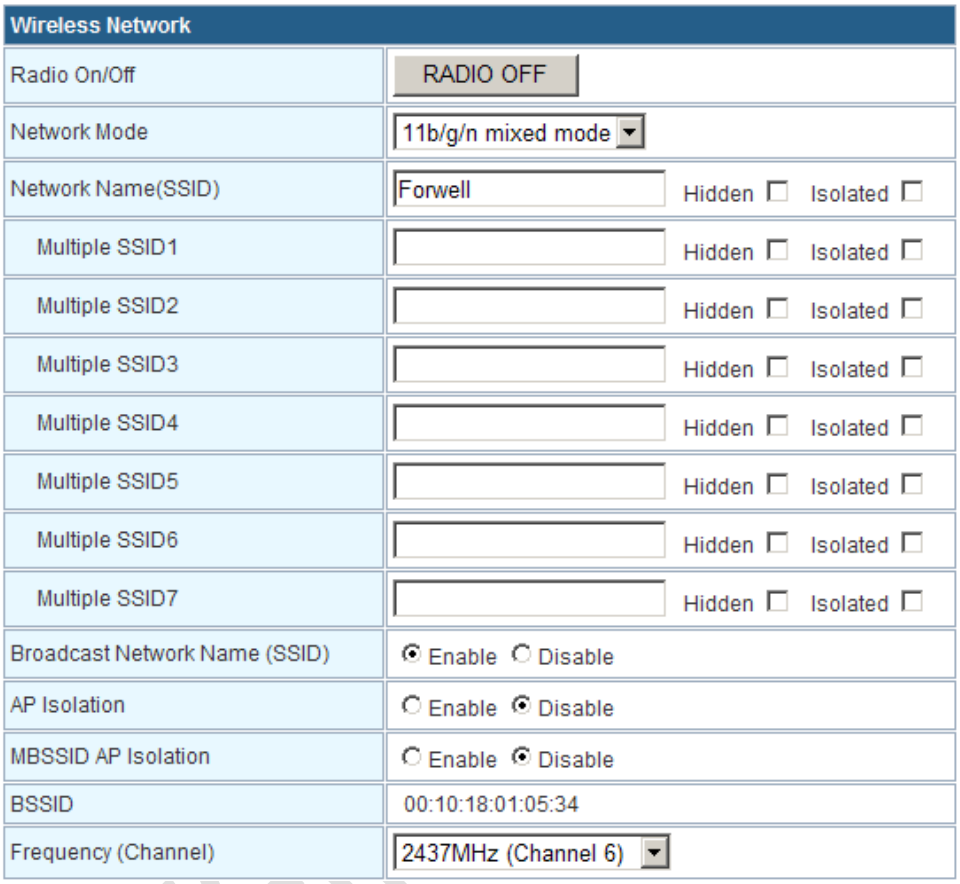
Due to different application requirements, R8 3G takes all these special requirements into consideration, so R8 3G provide you GPS service. Detailed settings as below:



- GPS Settings：1.GPS Action:enable/disable
  2.GPS Send to:Serial or TCP/IP
- Serial Settings：1.Baudrate:default 115200
  2.Parity:default none
  3.Datebit:default 8
  4.Stopbits:default 1
  5.Flow Control:default none
- GPS To TCP/IP Settings: 1.Socket Type:TCP/UDP
  2.Server:Server IP address
  3.Port:Server Port

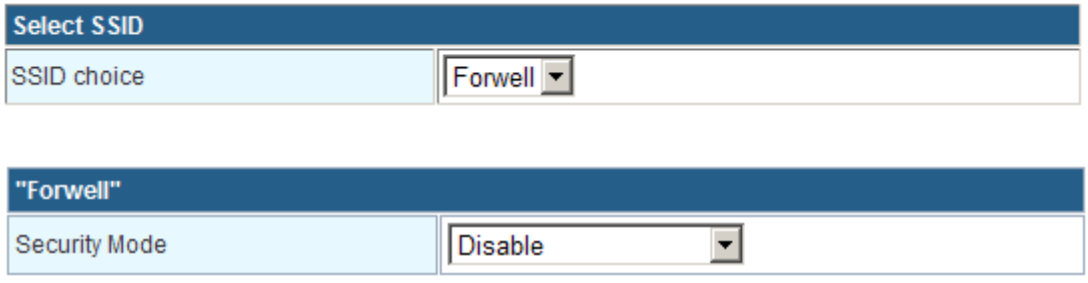
4.3.11 Wirless settings

4.3.11.1 Basic Wireless Settings



The basic parameters of Wi-Fi setting.
The Radio function enable and disable.
The network mode supports 802.11 b/g/n (draft).
Support multi-SSID up to 8.

4.3.11.2 Wireless Security/Encryption Settings



Access Policy	
Policy	Disable
Add a station Mac:	

The SSID select from multi-SSID setting.
Security mode include: disable, open, share, wep auto, WPA, wpa-psk, wpa2, wpa2-psk, wpa-psk/wpa2-psk, wpa/wpa2, 802.1X.
Access policy: setting the MAC list for access or deny.

4.3.12 Firewall

4.3.12.1 MAC/IP/Port Filter Settings

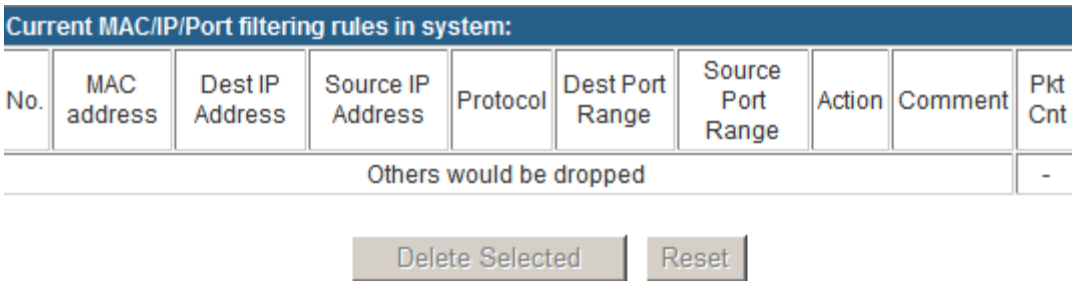
Basic Settings	
MAC/IP/Port Filtering	Disable
Default Policy -- The packet that don't match with any rules would be:	Dropped

Apply Reset

MAC/IP/Port Filter Settings	
MAC address	
Dest IP Address	
Source IP Address	
Protocol	None
Dest Port Range	-
Source Port Range	-
Action	Accept
Comment	

(The maximum rule count is 32.)

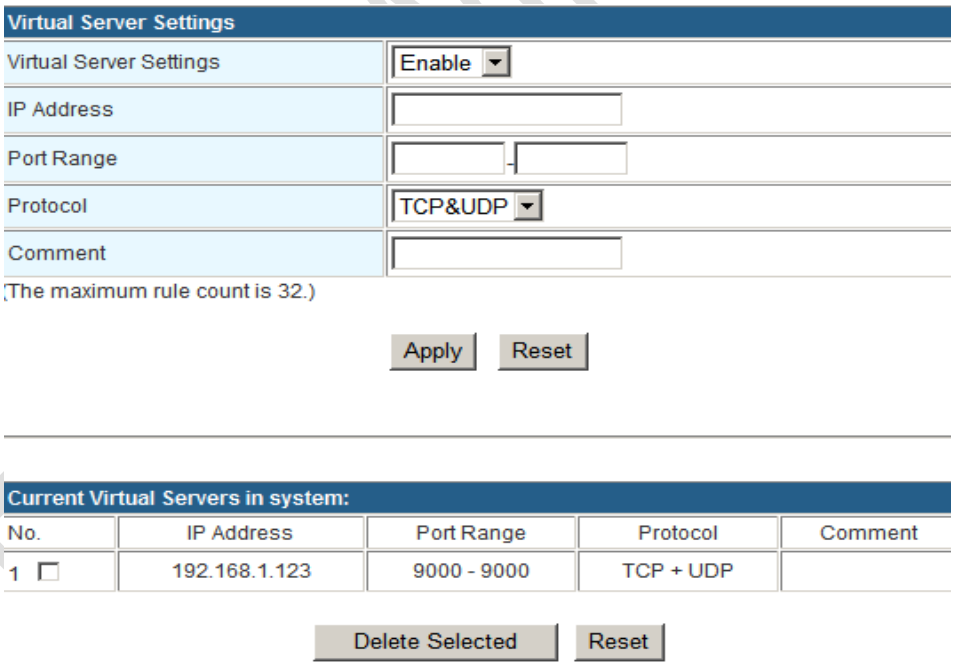
Apply Reset



This section is mainly about MAC/IP/Port filter settings

- **Basic Settings:** Open the filter setting and set the filtering principle.
- **MAC address:** Fill the MAC address which needs to filter.
- **Destination IP:** IP of the target computer(the computer which the data packet will be sent to)
- **Destination Port Range:** port range of target computer
- **Source Port Range:** port range of the computer which sends data

4.3.12.2 Port Forwarding

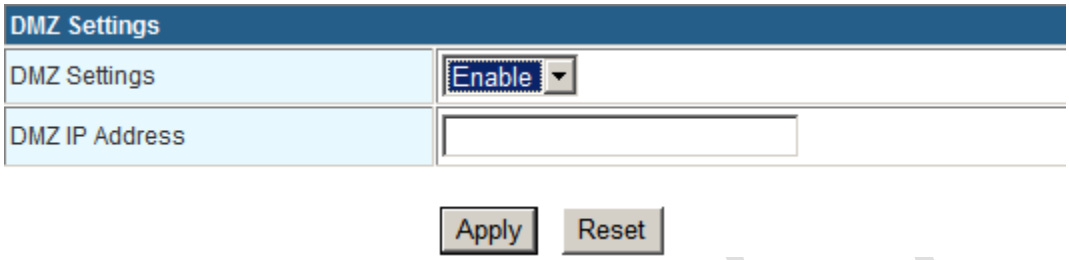


Port forwarding is the process that your router or firewall uses to sort the right kind of network data to the right port. Computers and routers use ports as a way to organize network data. Different types of data, such as web sites, file downloads, and online games, are each assigned a port number. By using port forwarding, the router or firewall sends the correct data to the correct place.

- Virtual Server Settings: open and close Settings.
- IP address: fill the IP address of forwarding.

- PortRange: fill the Port of forwarding.

4.3.12.3 DMZ Host

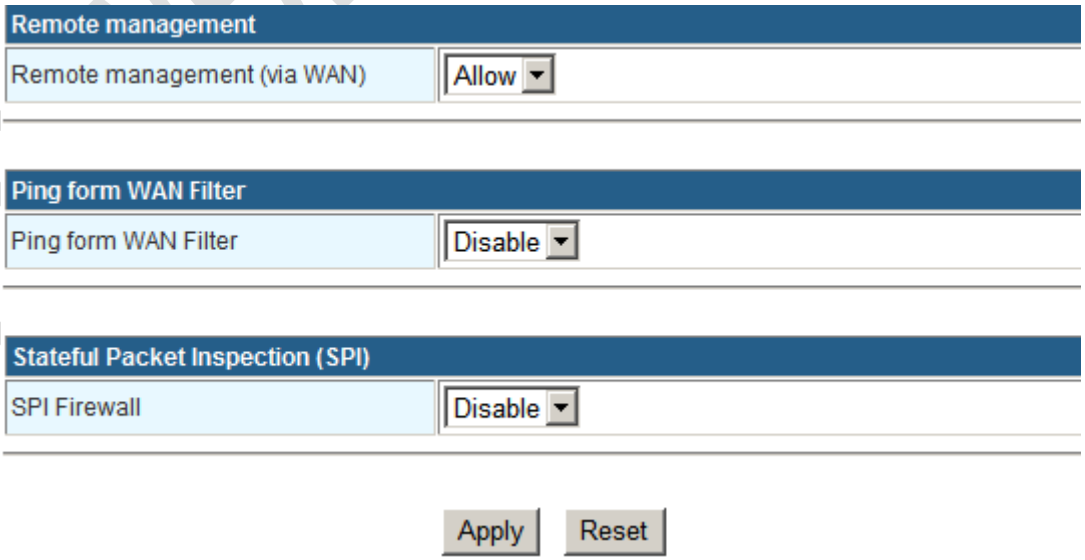


In computer networking, DMZ is a firewall configuration for securing local area networks (LANs).

- DMZ Settings: open and close Settings.
- DMZ host IP Address: Please Enter the IP address of the computer which you want to set as DMZ host

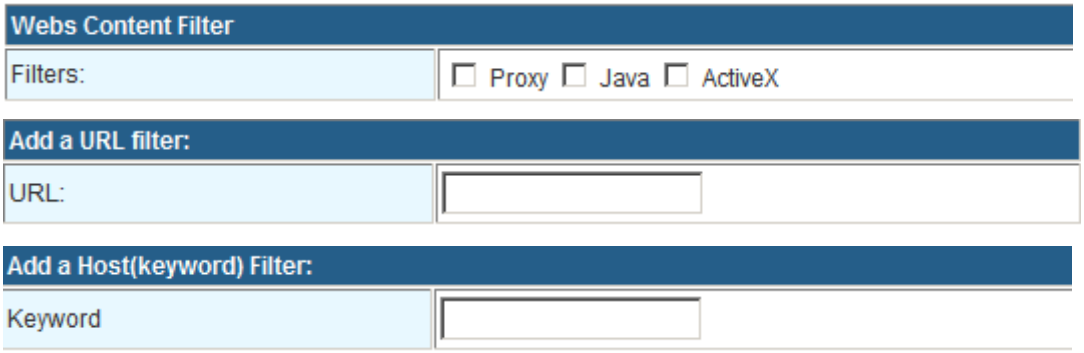
Note: When DMZ host is setted, the computer is completely exposed to the external network, the firewall will not influence this host.

4.3.12.4 System Security



Include Remote management,Ping from WAN Filter and SPI(Stateful Packet Inspection).

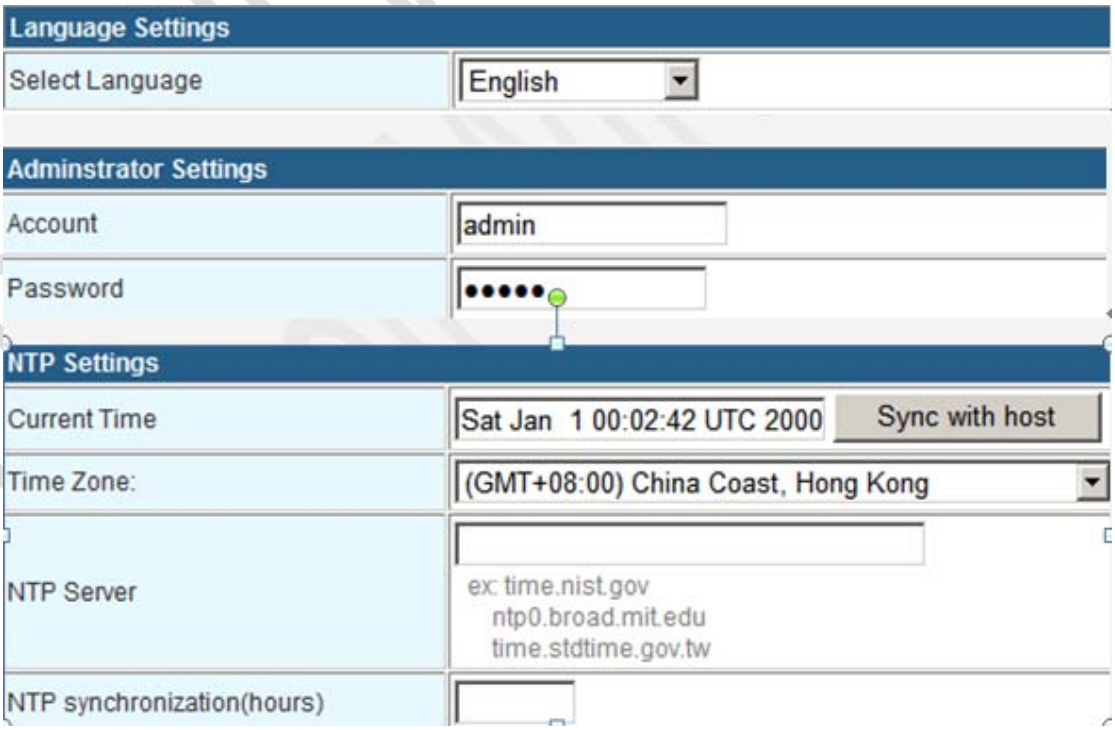
4.3.12.5 Content Filter Settings



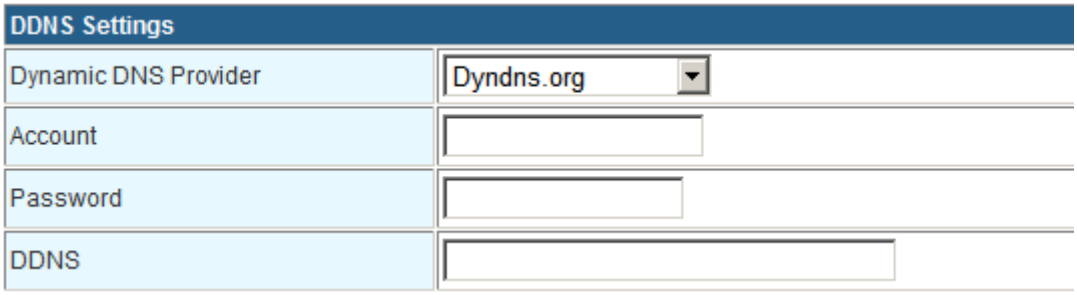
You can setup Content Fillter to restrict the improper content access,including Webs Content Settings,URL filter and Host Filter.

4.3.13 Administration

4.3.13.1 Management

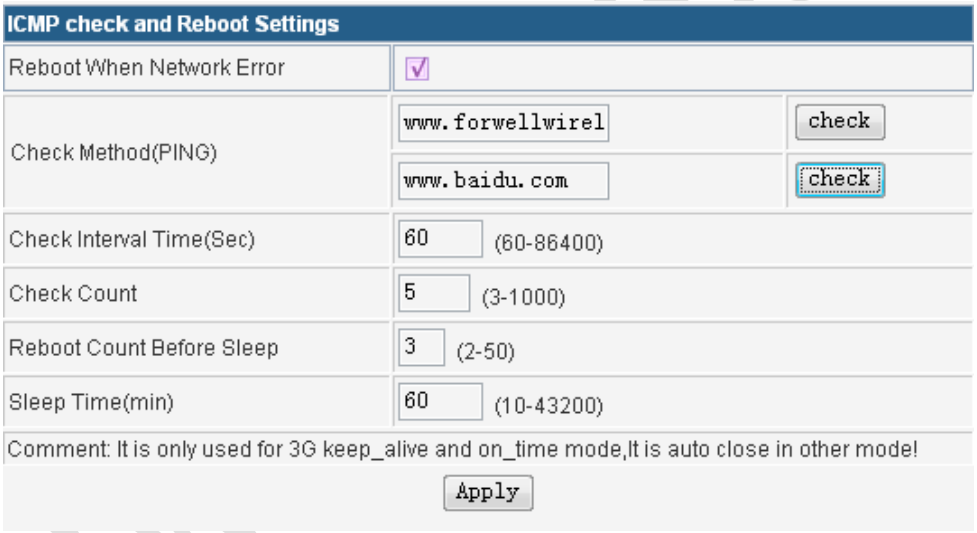


- Select Language
- Adminstrator Settings. The default both are admin.
- NTP Settings



DDNS: support Dyndns.org/freedns.afraid.org/www.zoneedit.com/www.no-ip.com

4.3.13.2 Reboot Settings



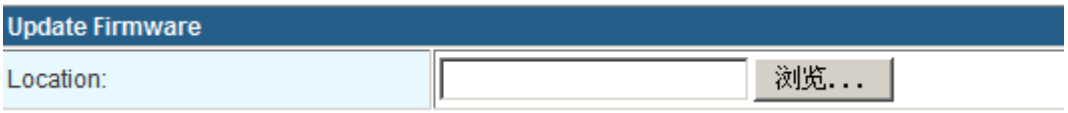
This function will detect the status of 3G by ping and complete the corresponding actions according to the ping result。

- Check the box, start the net detection restart function.
- Detection method (PING): fill the server domain name or IP, and then click the detection button, and detect if the fill-in is right.
- Detection interval time (second): the interval time between the first detection and the second detection is 60-86400 seconds.
- Detection counter: if you can't get the right result by ping when the detection frequency is the same as the fill-in times, the device will restart.
- Restart the counter before the detection function get into dormant state & detection function dormant time: this will protect the device against the damage caused by the continuous restarts, which are caused by the ping failure by the result of the fault in filling the server domain name. After several times of restarts, the device will get into the dormant state. After that the detection will continue, and now the

counter in flash will become zero and recount.

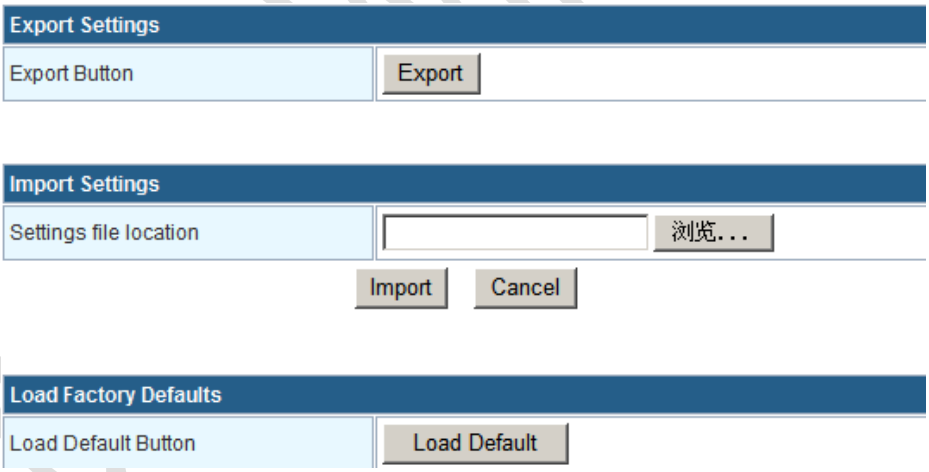
Note: This function will be only valid only in 3G permanent on-line and dialing according to the setting time,other states not.In setting ,firstly you must detect if the filled-in server domain name or IP is valid.

4.3.13.3 Upgrade Firmware



Upgrade the firmware to obtain new functionality. It takes about 2 minutes.

4.3.13.4 Parameter Management



Here you can make a backup of current settings or restore previous settings of the router .

- **Export settings:** click 'export' to export configuration files and then select save path.
- **Import settings:** click 'browse', select previous backup configuration files and then click 'Import'. Then all the previous settings will be recovered.
- **Load Factory Defaults:** click 'Load Default' then all settings will be restored to factory settings. This is not recommended in order to avoid the loss of important parameter

4.3.13.5 System state information

From the this page you can see the Router's basic running state.

- Product Model
- **Software Version**: software version reveals the status of software update.
- **Hardware Version**: 1.0.0
- **Device ID**: every device has a unique ID, which has two functions: 1, it is manageable; 2, it allows to use point to point in VPN.
- **System Uptime:** this time directly reveals router working hours.
- **Signal Strength:** reveals the current network state of 2G/3G. 0 and 99 mean no signal.
- **Attachment state:** displays the current network attachment state, which can be set by users.
- **WPN IP address:** the IP expose when the router gets on internet.

4.3.13.6 Flow Statistics

WAN/LAN	
WAN Rx packets:	0
WAN Rx bytes:	0
WAN Tx packets:	18
WAN Tx bytes:	1476
LAN Rx packets:	1063
LAN Rx bytes:	100996
LAN Tx packets:	572
LAN Tx bytes:	440808

Display the statistics information of system flow.

4.3.13.7 System log

System Log

```
Jan  1 00:00:22 kernel: dwc_otg lm0: DWC OTG Controller
Jan  1 00:00:22 kernel: drivers/usb/core/inode.c: creating file 'devices'
Jan  1 00:00:22 kernel: drivers/usb/core/inode.c: creating file '001'
Jan  1 00:00:22 kernel: dwc_otg lm0: new USB bus registered, assigned bus
Jan  1 00:00:22 kernel: dwc_otg lm0: irq 18, io mem 0x00000000
Jan  1 00:00:22 kernel: DWC_otg: Init: Port Power? op_state=1
Jan  1 00:00:22 kernel: DWC_otg: Init: Power Port (0)
Jan  1 00:00:22 kernel: usb usb1: default language 0x0409
Jan  1 00:00:22 kernel: usb usb1: new device strings: Mfr=3, Product=2, S
Jan  1 00:00:22 kernel: usb usb1: Product: DWC OTG Controller
Jan  1 00:00:22 kernel: usb usb1: Manufacturer: Linux 2.6.21 dwc_otg_hcd
Jan  1 00:00:22 kernel: usb usb1: SerialNumber: lm0
Jan  1 00:00:22 kernel: usb usb1: usb_probe_device
Jan  1 00:00:22 kernel: usb usb1: configuration #1 chosen from 1 choice
Jan  1 00:00:22 kernel: usb usb1: adding 1-0:1.0 (config #1, interface 0)
Jan  1 00:00:22 kernel: hub 1-0:1.0: usb_probe_interface
Jan  1 00:00:22 kernel: hub 1-0:1.0: usb_probe_interface - got id
Jan  1 00:00:22 kernel: hub 1-0:1.0: USB hub found
Jan  1 00:00:22 kernel: hub 1-0:1.0: 1 port detected
Jan  1 00:00:22 kernel: hub 1-0:1.0: standalone hub
Jan  1 00:00:22 kernel: hub 1-0:1.0: ganged power switching
Jan  1 00:00:22 kernel: hub 1-0:1.0: individual port over-current protect
Jan  1 00:00:22 kernel: hub 1-0:1.0: Single TT
Jan  1 00:00:22 kernel: hub 1-0:1.0: TT requires at most 8 FS bit times (
Jan  1 00:00:22 kernel: hub 1-0:1.0: power on to power good time: 2ms
Jan  1 00:00:22 kernel: hub 1-0:1.0: local power source is good
Jan  1 00:00:22 kernel: hub 1-0:1.0: enabling power on all ports
Jan  1 00:00:22 kernel: drivers/usb/core/inode.c: creating file '001'
Jan  1 00:00:22 kernel: nf_conntrack version 0.5.0 (256 buckets, 2048 max
Jan  1 00:00:22 kernel: IPv4 over IPv4 tunneling driver
```

From the system log you can read the various situations after the system starts.